Patent Claims

1. Use of core/shell particles whose shell forms a matrix and whose core essentially consists of a degradable polymer and has an essentially monodisperse size distribution and whose shell can be pyrolysed to give a carbon matrix, for the production of mouldings having regularly arranged cavities.

2. Use according to Claim 1, characterised in that the core consists of a material which is either not flowable or becomes flowable at a temperature above the melting point of the shell material.

3. Use according to at least one of the preceding claims, characterised in that the core:shell weight ratio in the core/shell particles is in the range from 5:1 to 1:10, in particular in the range from 2:1 to 1:5 and particularly preferably in the range from 1.5:1 to 1:2.

4. Use according to at least one of the preceding claims, characterised in that the shell in the core/shell particles consists of essentially uncrosslinked organic polymers which are grafted onto the core via an at least partially crosslinked interlayer, where the shell is preferably formed essentially from polyacrylonitrile (PAN) or copolymers containing polyacrylonitrile, such as polystyrene-acrylonitrile (PSAN).

5. Use according to at least one of the preceding claims, characterised in that the core in the core/shell particles is built up essentially from poly(styrene) and derivatives, such as poly(α-methylstyrene) or poly(styrene) derivatives carrying substituents on the aromatic ring, such as, in particular, partially or perfluorinated derivatives, poly(acrylate) and poly(methacrylate) derivatives as well as esters thereof, particularly preferably poly(methyl methacrylate), poly(tert-

butyl methacrylate), poly(methyl methacrylate), poly(n-butyl methacrylate) or poly(cyclohexyl methacrylate), or copolymers of these polymers with other degradable polymers, such as, preferably, styrene-ethyl acrylate copolymers or methyl methacrylate-ethyl acrylate copolymers, and polyolefins, polyolefin oxides, polyethylene terephthalate, polyformaldehyde, polyamides, polyvinyl acetate, polyvinyl chloride, polyvinyl alcohol or copolymers of these polymers.

6. Use according to at least one of the preceding claims, characterised in that the core/shell particles have a mean particle diameter in the range about 50 - 800 nm, preferably in the range 100 - 600 nm and particularly preferably in the range from 200 to 450 nm.

7. Use according to at least one of the preceding claims, characterised in that the mouldings are films.

8. Process for the production of mouldings having regularly arranged cavities, characterised in that core/shell particles whose shell forms a matrix and whose core essentially consists of a degradable polymer and has an essentially monodisperse size distribution and whose shell can be pyrolysed to give a carbon matrix are converted into mouldings (templates), preferably films, with application of a mechanical force and elevated temperature, and the cores are subsequently removed by degradation at elevated temperature and at the same time the shell is decomposed to give a carbon matrix.

9. Process according to Claim 8, characterised in that a mechanical force is applied through uniaxial pressing or during an injection-moulding operation or during a transfer-moulding operation or during (co)extrusion or during a calendering operation or during a blowing operation.

10. Process according to at least one of Claims 8 and 9, characterised in that the cores are removed by thermal degradation, preferably with exposure to air at temperatures of at least 150°C, preferably at least 200°C and particularly preferably at least 220°C.

11. Process according to at least one of Claims 8 and 9, characterised in that the cores are removed by degradation by means of UV radiation.

12. Process according to at least one of the preceding claims, characterised in that the matrix is pre-condensed in a first step, and the cores are only removed in a second, subsequent step.

13. Process according to at least one of Claims 8 to 11, characterised in that the cores are removed before or at the same time as the condensation of the matrix.

14. Process according to at least one of the preceding claims, characterised in that the carbon matrix is produced at temperatures in the range from 700 to 1200°C, preferably in the range from 800 to 1000°C, with exclusion of air.

15. Mouldings having regularly arranged cavities which are embedded in a carbon matrix, characterised in that the mouldings are obtainable by a process in which core/shell particles whose shell forms a matrix and whose core essentially consists of a degradable polymer and has an essentially monodisperse size distribution and whose shell can be pyrolysed to give a carbon matrix are converted into mouldings (templates), preferably films, with application of a mechanical force and elevated temperature, and the cores are subsequently removed by thermal degradation at elevated temperature and at the same time the shell is decomposed to give a carbon matrix.

16. Mouldings having regularly arranged cavities which are embedded in a carbon matrix, characterised in that the mouldings have directed ellipsoidal cavities.

17. Mouldings according to at least one of Claims 15 or 16, characterised in that the cavities have a mean diameter in the range about 50 - 500 nm, preferably in the range 100 - 500 nm and very particularly preferably in the range from 200 to 280 nm.

18. Use of mouldings according to at least one of Claims 15 to 17 and/or of mouldings produced in accordance with at least one of Claims 8 to 14 as photonic material.

19. Use of mouldings according to at least one of Claims 15 to 17 and/or of mouldings produced in accordance with at least one of Claims 8 to 14 for the production of electro-optical devices.

20. Electro-optical device containing mouldings according to at least one of Claims 15 to 17 and/or mouldings produced in accordance with at least one of Claims 8 to 14.